

Contents

1 Routine/Function Prologues	2
1.0.1 noah_writerst.F90 (Source File: noah_writerst.F90)	2

1 Routine/Function Prologues

1.0.1 noah_writerst.F90 (Source File: noah_writerst.F90)

This program writes restart files for NOAH. This includes all relevant water/energy storages, tile information, and time information. It also rectifies changes in the tile space.

REVISION HISTORY:

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1 Oct 1999: Jared Entin; Initial code
15 Oct 1999: Paul Houser; Significant F90 Revision
05 Sep 2001: Brian Cosgrove; Modified code to use Dag Lohmann's NOAA
              initial conditions if necessary. This is controlled with
              local variable NOAAIC. Normally set to 0 in this subroutine
              but set to 1 if want to use Dag's NOAA IC's. Changed output
              directory structure, and commented out if-then check so that
              directory is always made.
28 Apr 2002: Kristi Arsenault; Added NOAH LSM into LDAS
28 May 2002: Kristi Arsenault; For STARTCODE=4, corrected SNEQV values
              and put SMC, SH20, STC limit for GDAS and GEOS forcing.
14 Jun 2003: Sujay Kumar , Separated the write restart from the original
              code

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RESTART FILE FORMAT(fortran sequential binary):

```

YR,MO,DA,HR,MN,SS,VCLASS,NCH !Restart time,Veg class,no.tiles, no.soil lay
TILE(NCH)%COL          !Grid Col of Tile
TILE(NCH)%ROW          !Grid Row of Tile
TILE(NCH)%FGRD         !Fraction of Grid covered by tile
TILE(NCH)%VEGT         !Vegetation Type of Tile
NOAH(NCH)%STATES      !Model States in Tile Space

```

INTERFACE:

```

subroutine noah_writerst()
!uses:
use lisdrv_module, only : lis,tile
use time_module
USE noah_varder        ! NOAH tile variables
use time_manager
use tile_spmdMod

```

CONTENTS:

```

if(masterproc) then
!-----
! Restart Writing (2 files are written = active and archive)
!-----
if((lis%t%gmt.eq.(24-noahdrv%writeintn)) &
   .or.lis%t%endtime.eq.1)then
  allocate(tmptilen(lis%d%nch))
  open(40,file=noahdrv%noah_rfile,form='unformatted') !Active archive restart

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call timemgr_write_restart(40)
write(40) lis%p%vclass,lis%d%lnc,lis%d%lnr,lis%d%nch !Veg class, no tiles
write(40) noah%t1           !NOAH Skin Temperature (K)
write(40) noah%cmc          !NOAH Canopy Water Content
write(40) noah%snowh         !NOAH Actual Snow Depth
write(40) noah%sneqv        !NOAH Water Equivalent Snow Depth
do l=1,4
  do t=1,lis%d%nch
    tmptilen(t)=noah(t)%stc(1)
  enddo
  write(40) tmptilen !NOAH Soil Temperature (4 layers)
enddo
do l=1,4
  do t=1,lis%d%nch
    tmptilen(t)=noah(t)%smc(1)
  enddo
  write(40) tmptilen !NOAH Total Soil Moist. (4 layers)
enddo
do l=1,4
  do t=1,lis%d%nch
    tmptilen(t)=noah(t)%sh2o(1)
  enddo
  write(40) tmptilen !NOAH Liquid Soil Moist. (4 layers)
enddo
write(40) noah%ch           !NOAH Heat/Moisture Sfc Exchange Coef.
write(40) noah%cm           !NOAH Momentum Sfc Exchange Coef.
close(40)
write(*,*)'Noah Active restart written: ',noahdrv%noah_rfile
write(unit=temp,fmt='(i4,i2,i2,i2)') lis%t%yr,lis%t%mo, &
  lis%t%da,lis%t%hr
read(unit=temp,fmt='(10a1)') ftime
do i=1,10
  if(ftime(i).eq.( ' ))ftime(i)='0'
enddo
write(unit=temp,fmt='(a4,i3,a6,i4,a1,i4,i2,i2,a6,i3,a1)') &
  '/EXP',lis%o%expcode,'/NOAH/',lis%t%yr, &
  '/',lis%t%yr,lis%t%mo, &
  lis%t%da,'/LIS.E',lis%o%expcode,'.'
read(unit=temp,fmt='(80a1)') (fname(i),i=1,37)
do i=1,73
  if(fname(i).eq.( ' ))fname(i)='0'
enddo

write(unit=temp,fmt='(a9)')'mkdir -p '
read(unit=temp,fmt='(80a1)')(fmkdir(i),i=1,9)
write(unit=temp,fmt='(a4,i3,a6,i4,a1,i4,i2,i2)') &
  '/EXP',lis%o%expcode,'/NOAH/, &
  lis%t%yr,'/',lis%t%yr,lis%t%mo,lis%t%da

```

```

read(unit=temp,fmt='(80a1)') (fyrmkdir(i),i=1,26)
do i=1,26
  if(fyrmkdir(i).eq.(' '))fyrmkdir(i)='0'
enddo

write(unit=temp,fmt='(a8)')'Noahrst'
read(unit=temp,fmt='(80a1)') (fsubs(i),i=1,8)

write(unit=temp,fmt='(a40)') lis%o%odir
read(unit=temp,fmt='(80a1)') (fbase(i),i=1,80)
c=0
do i=1,80
  if(fbase(i).eq.(' ').and.c.eq.0)c=i-1
enddo
write(unit=temp,fmt='(80a1)')(fbase(i),i=1,c),(fname(i),i=1,37), &
  (ftime(i),i=1,10),(fsubs(i),i=1,8)
read(unit=temp,fmt='(a80)')filen

write(unit=temp,fmt='(80a1)')(fmkdir(i),i=1,9),(fbase(i),i=1,c), &
  (fyrmkdir(i),i=1,26)
read(unit=temp,fmt='(a80)')mkfyrmo

!-----
! Archive File Name Generation Complete
! Make the directories for the NOAH restart file
!-----
CALL SYSTEM(MKFYRMO)
!-----
! Archive File Name Generation Complete
!-----
open(40,file=filen,status='unknown',form='unformatted')
write(40) lis%p%vclass,lis%d%lnc,lis%d%lnr,lis%d%nch !veg class, no tiles
write(40) noah%t1           !noah skin temperature (k)
write(40) noah%cmc          !noah canopy water content
write(40) noah%snowh         !noah actual snow depth
write(40) noah%sneqv        !noah water equivalent snow depth
do l=1,4
  do t=1,lis%d%nch
    tmptilen(t)=noah(t)%stc(l)
  enddo
  write(40) tmptilen !noah soil temperature (4 layers)
enddo
do l=1,4
  do t=1,lis%d%nch
    tmptilen(t)=noah(t)%smc(l)
  enddo
  write(40) tmptilen !noah total soil moist. (4 layers)
enddo

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```
do l=1,4
    do t=1,lis%d%nch
        tmptilen(t)=noah(t)%sh2o(l)
    enddo
    write(40) tmptilen !noah liquid soil moist. (4 layers)
enddo
write(40) noah%ch      !noah heat/moisture sfc exchange coef.
write(40) noah%cm      !noah momentum sfc exchange coef.

close(40)

write(*,*)'noah archive restart written: ',filen
deallocate(tmptilen)
endif
endif
return
```